

What is claimed is:

1. A wavelength dispersion compensation system,
comprising:

- 5 an optical transmitting end station
wavelength-multiplexing optical signals, and outputting
a wavelength-multiplexed signal to a transmission line;
a plurality of first optical repeater nodes
arranged on the transmission line; and
10 at least one second optical repeater node, which
is arranged among said plurality of first repeater nodes
arranged on the transmission line, wherein
each of said plurality of first optical repeater
nodes compensates for dispersion whose value is larger
15 than a value of dispersion which occurs between said
optical transmitting end station or an adjacent first
optical repeater node or an adjacent second optical
repeater node and the first optical repeater node itself,
and
20 said second optical repeater node compensates for
dispersion so that residual dispersion occurs for a value
obtained by subtracting a value of dispersion, which
is compensated by a first optical repeater node between
said optical transmitting end station or a second optical
25 repeater node at a preceding stage and said second optical

repeater node itself, from a value of dispersion in a transmission line, which occurs between said optical transmitting end station or the second optical repeater node at the preceding stage and said second optical
5 repeater node itself.

2. The wavelength dispersion compensation system according to claim 1, wherein
said second optical repeater node is a node which
10 adds/drops an optical signal.

3. The wavelength dispersion compensation system according to claim 1, wherein
said second optical repeater node is a compensation
15 node compensating for a gain deviation and a compensation error of a wavelength dispersion slope, which accumulate as a wavelength division multiplexed optical signal propagates the system.

20 4. The wavelength dispersion compensation system according to claim 1, wherein
said second repeater node is a node switching a path of an optical signal for each arbitrary wavelength.

25 5. The wavelength dispersion compensation

system according to claim 1, the system transmitting both of an optical signal whose bit rate per wavelength is 10 Gbps, and an optical signal whose bit rate per wavelength is 40 Gbps.

5

6. The wavelength dispersion compensation system according to claim 5, wherein

the optical signal whose bit rate per wavelength is 40 Gbps is used only for a transmission between said
10 optical transmitting end station and a particular node, between particular nodes, or between a particular node and an optical receiving end station.

7. A wavelength dispersion compensation method,
15 which has an optical transmitting end station wavelength-multiplexing optical signals and outputting a wavelength-multiplexed signal to a transmission line, a plurality of first optical repeater nodes arranged on the transmission line, and at least one second optical
20 repeater node, which is arranged among the plurality of first repeater nodes arranged on the transmission line, comprising:

compensating for dispersion whose value is larger than a value of dispersion which occurs between the
25 optical transmitting end station or an adjacent first

optical repeater node or an adjacent second optical repeater node and the first optical repeater node itself, by each of the plurality of first optical repeater nodes; and

5 compensating for dispersion so that residual dispersion occurs for a value obtained by subtracting a value of dispersion, which is compensated by a first optical repeater node between the optical transmitting end station or a second optical repeater node at a
10 preceding stage and the second optical repeater node itself, from a value of dispersion in a transmission line, which occurs between the optical transmitting end station or the second optical repeater node at the preceding stage and the second optical repeater node
15 itself, by the second optical repeater node.

8. The wavelength dispersion compensation method according to claim 7, wherein

the second optical repeater node is a node which
20 adds/drops an optical signal.

9. The wavelength dispersion compensation method according to claim 7, wherein

the second optical repeater node is a compensation
25 node compensating for a gain deviation and a compensation

error of a wavelength dispersion slope, which accumulate as a wavelength division multiplexed optical signal propagates the system.

5 10. The wavelength dispersion compensation method according to claim 7, wherein

 the second repeater node is a node switching a path of an optical signal for each arbitrary wavelength.

10 11. The wavelength dispersion compensation method according to claim 7, the system transmitting both an optical signal whose bit rate per wavelength is 10 Gbps, and an optical signal whose bit rate per wavelength is 40 Gbps.

15

 12. The wavelength dispersion compensation method according to claim 11, wherein

 the optical signal whose bit rate per wavelength is 40 Gbps is used only for a transmission between the
20 optical transmitting end station and a particular node, between particular nodes, or between a particular node and an optical receiving end station.